Menlo Park Notebook #197 [N-82-06-08]

This notebook covers the period June-August 1882. Most of the entries are by Edison. There are also a few entries by Charles Batchelor. At the beginning of the book are notes by Batchelor on a record-keeping system for electric light companies. The remainder of the book contains notes and drawings by Edison, many of them for a draft caveat concerning lamps, generators, arc lights, and methods for regulating the electromotive force of the current. The label on the front cover is marked "Book Keeping for Electric Light." The book contains 280 numbered pages.

Blank pages not filmed: 122-123, 140-145, 156-197, 216-265, 272-273, 276-279.

Carbons for Elec Arc.
arc Lamps.
field Reglt~~r~~.
Secy Catlins.
Reciprocating Dynamos
Covering wire with Lead
with iron pipe —
Zinc pipe

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44 Broad St. N.Y.

May 1, 1896

A system for Keeping the Histories and Accounts of Electric Lighting Companies with the necessary forms for such Companies

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Superintendents Department

Relating to the manufacture and distribution

First the Superintendent should have a plan of the central Station with the location of every ~~steam~~ boiler, generator, steam connection, pumps, heaters also every Electrical Connection and position of the mains as they leave the ~~central Sta~~ building.

he should also have a
plan of all main wires and
connection boxes etc

These plans should be kept
in a frame and should be
easy to remove to make any
necessary alterations —

Reading of water meter
Ashes thrown out.

Book 1

Boiler Room account

Date	Coal Received	No of hours running for each boiler									
		1	2	3	4	5	6	7	8	9	10

This to be kept by the Boiler room attendant

Book 2

Engine Room account

Date — Pressure Steam

No of hours for each engine Put on / taken off 1 2 3 4 5 6

Total Consumption

~~Consumption Not Chargeable~~

Date		No of hours for each Engine										Steam Pressure	Total Consump
		1	2	3	4	5	6	7	8	9	10		
	Put on												
	taken off												

~~Superintendent~~
2 Engineers
2 Helpers
2 Regulators
2 Firemen
4 Laborers 1 Wiper
Lamp boy

Central Station

Chief Engineer is supposed to have full charge of everything & to be able to attend to accidents in case of necessity

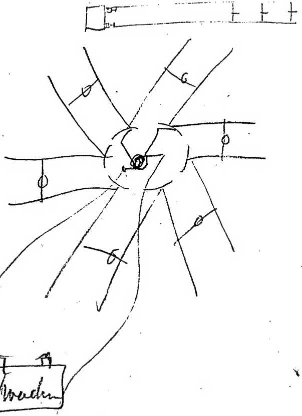
Executive Office
has charge of
New houses (putting in)
Making renewals
Putting new plant
repairs
Supplies
and executive duties
paying wages.

The Street lamps will
be of given candle power
and be charged for the length of time
they burn

The Street Circuits will be taken direct from the main -

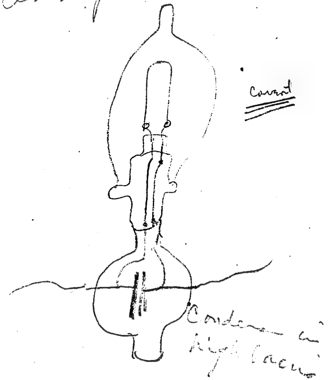
TAE

Reducing EMF -



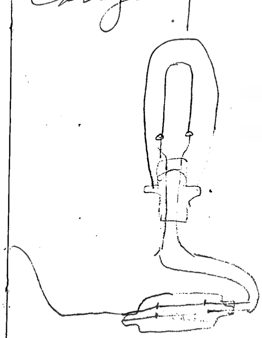
June 8 1882 TAE

peculiar Carrying in Lamp



Prevention Electrical Company

Caveat



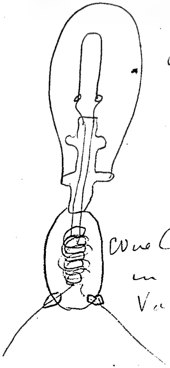
heated carbon

Expmt Elec Carrying

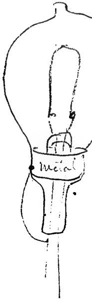
Jan 8 1882

TAE

Caveat

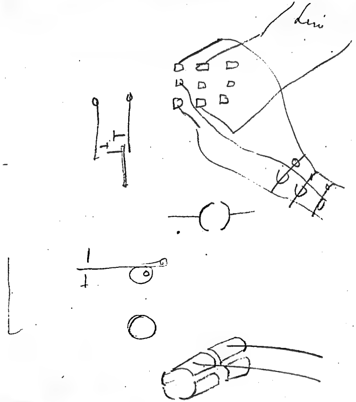


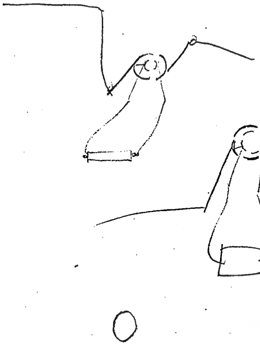
Expts. Electrical Company

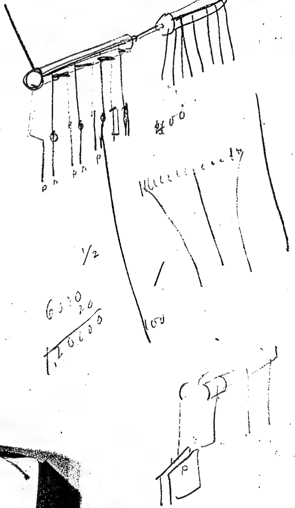


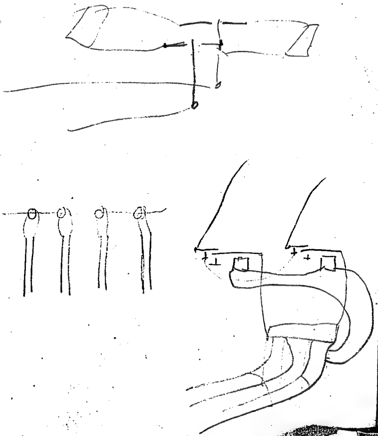
Jan 8 1882
TAE

Caveat



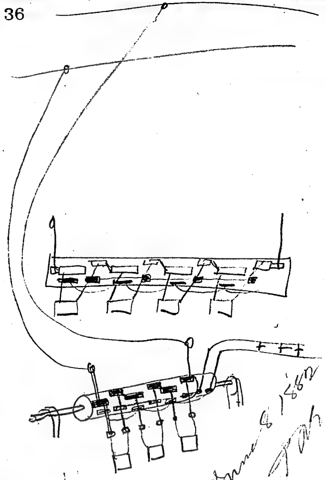






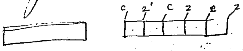
I propose to use 200 double plate cells of lead only exceedingly close together probably like a dry pile with moistened wool between with SO_3 - and charge these batteries across multiple are in series & discharge in multiple are (ie) 450 volts would give 50 or 50 volts a clime on battery & touches main line for an instant & changed in Tension (commutator separation through it in quantity) the next instant & simultaneously throws lamps on this is done several times a second, 1 apparatus is put in each house with meter which acts to discommut all

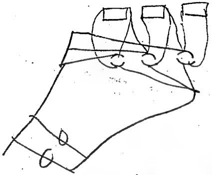
there is sufficient charge
but the instant it falls
below a definite amount
the rapid chgg & dischg
mechanism works; this
can also be done by a
mentioned armature & mag
across the Camp ckt



June 8 1882
TAE

June 8 1882 TAE





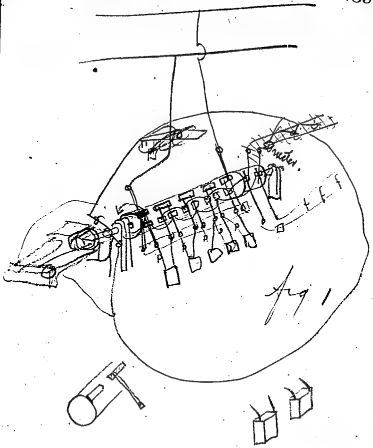
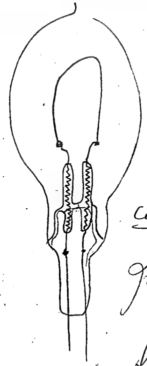


fig 1

June 8 1882
TAE

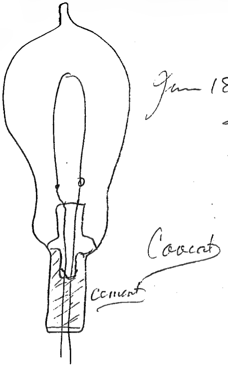


Caveat

June 18 1882

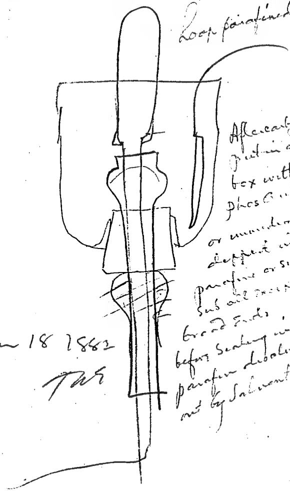
TAE

fig 1 Caveat



Jan 18 1882

Loop paraffined



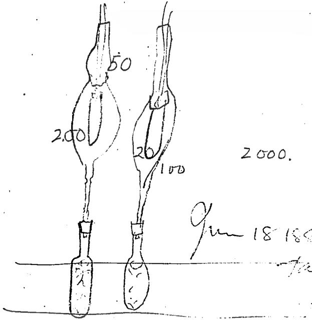
After carbon put in drying box with phos anhydride or immediately dipped in paraffine or similar sub all except broad ends before sealing in paraffine dissolved out by solvents

Jun 18 1882

TAE

57.

1



2000.

Jan 18 1882

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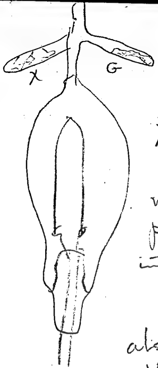
after sealing on & drying.
to be kept with phial
amber tube on

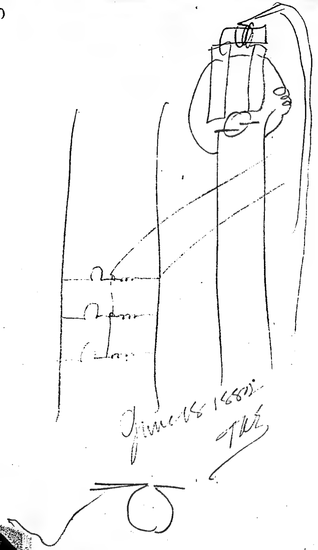


X phos anhyd
G Charcoal
made red +
plunged ~~under~~
into Chlorine gas -

also hot +
Kept in box
with phos anh
until put in
lamp -

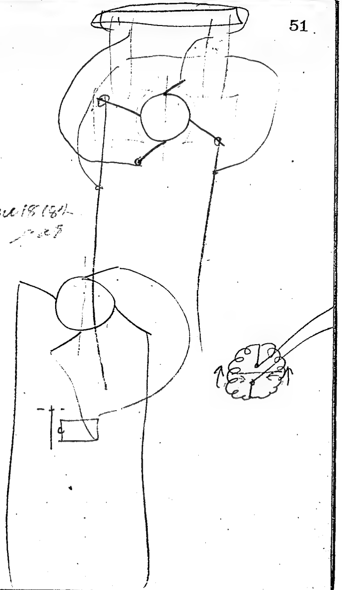
also charcoal red
hot + put into
melted Chl Carbon

June 18 1882
TAE



June 18 1882
TAE

June 18 1882



June 18 1882

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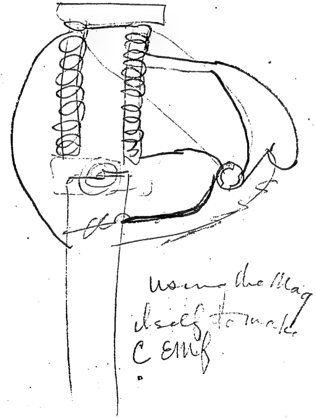
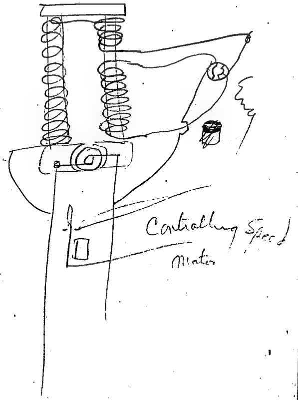
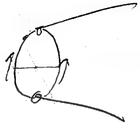
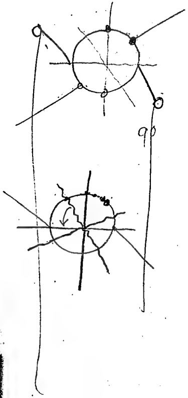
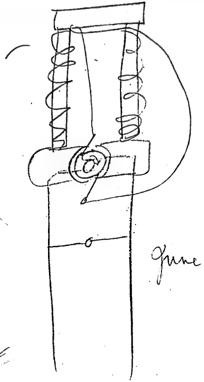


using the Mag itself to make C EMF


Controlling Speed
Motor







June 1882
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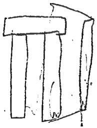

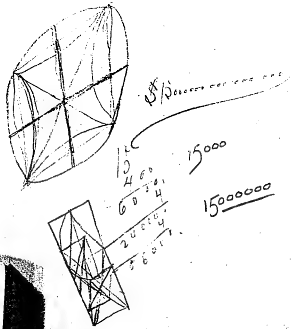
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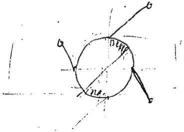

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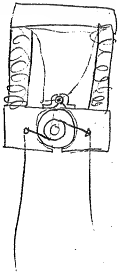
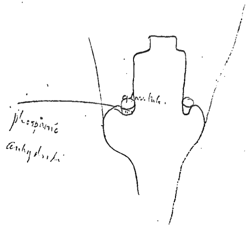


June 18 1882.
Edison

June 18 1884 -
Carried
Paper c
organic material
heated over phosphoric
anhydride to paper
put in Lamp to
absorb the vapor
water TAE



Valley Wabash Valley

Wabash Valley

W 400 64109

Frang

François Frangapani

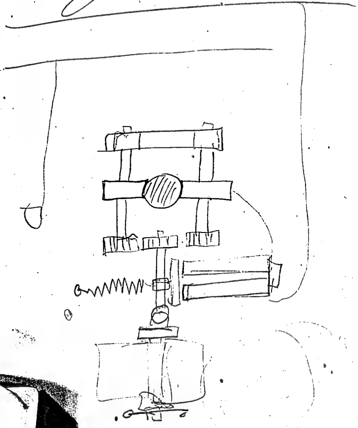
Françoise Frangapani

W Wabash

Count

Use the fibre of the
agave americana
for lamps scraping off
the outside [illegible] [illegible] ff.

June 18. 1882
TAE



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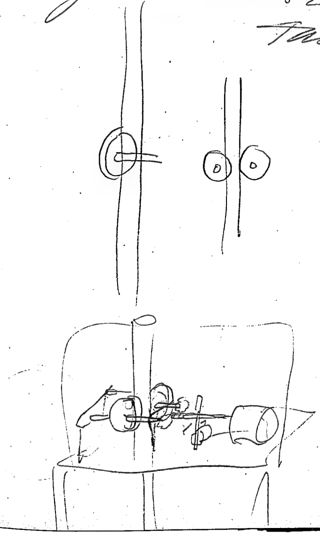
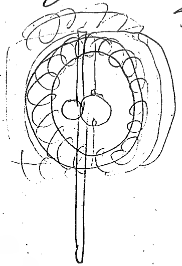


June 18 1882
[illegible]



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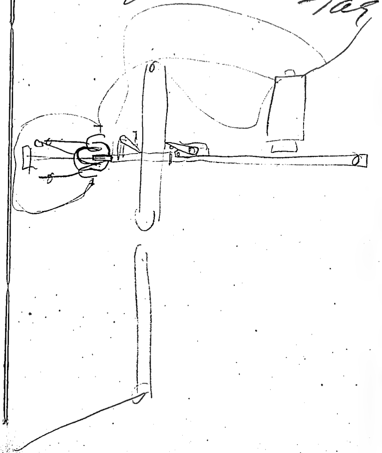
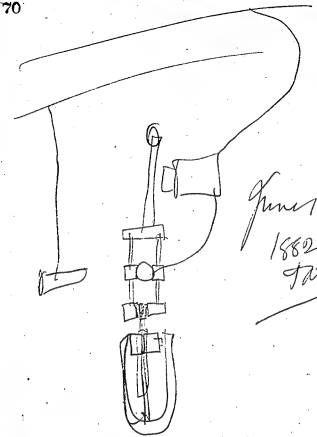
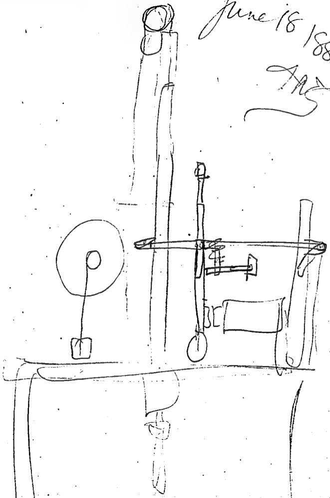
[illegible]

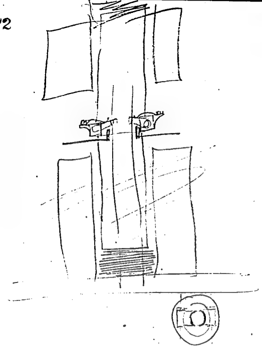


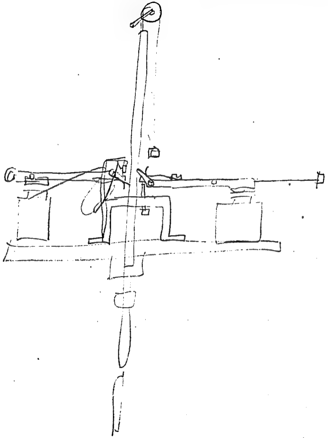


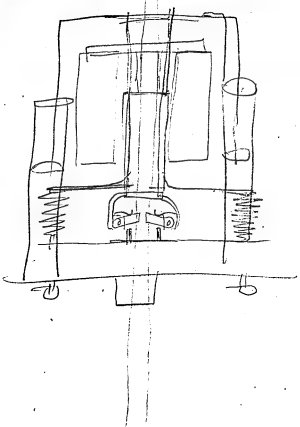
June 18
1882
TAE

June 18 1882
TAE









Caveat.

The object of this Caveat is to set forth various devices and inventions which I have perfected for use in my system of Electric Lighting, but which requires the invention and arrangement for economical manufacture etc that they may be used commercially

= In Electric Lamps when very high candle power and electrical current[?] is used the sealing in of the wire through the lamp should be very perfect I use a platina leading in wire wound in the form of a spiral and both of the wires are sealed in tubes before final sealing to the inside part. See fig 1.

Straight Platina wires coated with Tin Lead or other soft metal may be used. Even platina

may be dispensed with and
Nickel iron Copper ~~and~~ Silver
Cobalt Steel & other wires
may be coated with tin lead
or other soft metal & sealed
in the glass, the Expansion &
Contraction of the glass being
allowable as the soft metal
gives, In the case of platinum
lead ~~gives~~ Combines with both
the glass and the platina
& therefore makes a good seal,
The platinum may be coated
with an oxide of lead mixed with
anhydrous Oxide of sodium
and fused in the glass the
lead attacks the platina &
the lead oxide soda & glass
Combines at the high
temperature to form glass

thus making a perfect seal
other metals as heretofore
mentioned may be used instead
of platina.
finely divided platinum may be
mixed with glass to such an
extent as to cause the glass-
platinum mixture to become
of sufficient conductivity
to be used as leading in wires
in this case there is a very
perfect seal - when platina
alone or platinum-Iridium
alloy is used for the leading
in wires I prefer to put it
through my process for
freeing it of air patented
in 1879 - I have made
lamps in which in addition
to the glass seal a cement

Was poured into the inside part that was not in vacua, this Cement is preferably a cement having no pores with vitrous fracture, Sealing wax & high boiling points tars resins are useful. –

To keep water from being absorbed by the carbonized filaments of carbonization I dip them when they are taken out of the mould in a solution containing a dissolved solid the menstrium having no water paraffine dissolved in ~~B[illegible]~~ a hydrocarbon liquid will cause the Carbon when dipped to be

Covered with a skin of paraffine, Beeswax, resins, gums Tar ~~etc~~ may be used all but ~~the~~ broadened Ends are so dipped, ~~afterwards~~ the Carbons are connected to the leading in wires & plated to them Electrically Really.

When before the Carbons are sealed in the ~~inner~~ bulb of the Lamp the paraffine or other gum or substance is well dissolved out by immersing the loop in a solvent of the substance on the Carbon The loop is then sealed in the globe

and the top of the bulb has
a long tube upon the End
on the End of this tube is a
piece of rubber tubing.
Small tubes closed at one
End are filled with a drying
agent such as Sulphuric or
Phosphoric anhydride -
~~pentachloride of phosphorus~~
Chloride Calcium burned Sulphate Copper or other
drying agents. and this tube
is provided with a bevelled
mouth into which the rubber
of the tube on the lamp fits
The lamps are kept with these
drying tubes on until ready
for Exhaustion on the pump
When they are placed on a
revolving heater and heated

& then placed on the pumps
a very rapid way of driving out
~~the moisture is to heat the~~
~~lamp by the revolving heater~~
~~then~~ place ~~the~~ bulb in connection
~~with~~ an exhausting & forcing
pump the bulb remaining on
ice. and Exhausting the air
& then forcing fresh air into
the bulb which must pass
over a long ~~tube~~ filled with
phosphoric anhydride or other
drying agents. when the
moisture has been driven out
of ~~the~~ lamp it is placed on
the revolving heater and heated
very hot and then placed
on the pumps - In ~~a~~ two side
tubes connected to the Exhaust
tube of the Electric Lamp

one tube may have a drying agent such as phosphoric anhydride while the other may have organic charcoal which has been made red hot & then allowed to cool for an instant & plunged into dry chlorine gas. the charcoal absorbs chlorine. It is then placed in the tube, the bulb being previously dried as mentioned, the lamp is exhausted. the charcoal tube sealed off at once or after a time while the phosphoric anhydride tube may remain on for a greater length of time

of course in Exhausting
the Lamp the filament is
at time brought to incandescence
I well mention that the single tube
might be used containing the
drying agent & the chlorinated
Charcoal and it might be sealed
off the lamp or kept in permanent
Connection therewith =
a Small ball of charcoal
filled with phosphorus anhydride
or other drying agent might
be used within the Lamp.
the charcoal being impregnated
with Chlorine, pure anhydrous Alumina.
Silica in a finely divided State
& pressed up into hollow Cubes
balls or other shapes might
have be filled with a drying

agent. Even paper & many other organic fibres ~~to be~~ act as powerful drying agents & might be used.

A good method of regulating the Electromotive force of the lamp circuit automatically from the Dynamo or rather magneto Electric machine is to use separate brushes on the Commutator to work the field and so place these brushes that when the load increases by putting in lamps. ~~advantage~~ advantage will be taken of the shifting of the neutral point on the Commutator due to load to give a greater Electromotive force across these two brushes employed to give the field

magnet as Current, when the ~~two~~ brushes are placed at right angles to the brushes that from the lamp circuit. ~~it acts press~~ the field forms the bridge wire of a whcatstone balance ~~to ab~~ ~~this~~ is when the load is very light hence to obtain sufficient Emf. to energize the few lamps ~~that~~ that are on the brushes must be set off of the exact neutral point, now if the load is increased by adding lamps the neutral point will shift & while this causes the Emf of the

mainline brushes to drop the EMF between the field brushes increases hence the drop in EMF on one is nearly compensated ~~by the~~ rise in the other due to ~~the~~ action of the field magnet

Another method of regulating is to use a small Electric Engine for rotating brushes around a Commutator & have this Commutator connected to a portion only of the coils around the field magnet this portion being more or less rapidly reversed by the rapidly revolving brushes the Engine being controlled by a magnet ~~or thermo~~ across

multiple arc or by a ~~thermostat~~ playing between ~~two~~ points. another device for regulating the E.M.F. of a ~~D~~ynamic machine consists in interpolating in the line a Resistance in the form of several small wire multipled or a sheet, and winding this around a cylinder of mercury with a long tube extending therefrom into which there a several platinum wires connected to resistance coils in the field of force magnets the rise & fall of the mercury column serving to cut in & ~~out~~ more or less resistance as more or less lamps are put on

~~this~~ mercury controller might be surrounded with very fine wire & the wire placed in multiple arc or it might receive its heat from an Electric Lamp radiating upon it such lamp being placed in multiple ~~arc~~ across the line,

another method of regulating the Lamp circuit consists in using an Extension from the polar field ~~series & between~~ which Extension a small induction bobbin is rotated by a belt from the dynamo. this belt is shifted by an Electric magnet

so it will either go slow
or fast the electromagnet
being either in or across
the line, thermostatic devices
may also control it =
this little bobbin is connected
to the field of force coils +
serves to energize them.

another form of governor consists
of the driving pulley either
on the machine or from a
countershaft or even
the Engine being loose on the
shaft and is connected
to the shaft through the
intermediary of a spring
+ lever which lever serves
to throw resistance in

and out of the ~~arm~~ field
of fera magnets. If but
~~lot~~ few lamps are on the circuit.
the drag on the pulley is
light the spring is scarcely
depressed and all the
resistance is in. if now
the load is increased.
the spring will be depressed
and ~~more~~ resistance will
be cut out of circuit.

another device consists in
making a small portion of the
curved polar extension of
the field magnet detached
& moveable; have means
about 1/2 inch wide & 1/2 thick
from part of the polar piece.

and are connected together
at the neutral point opening
by brass, a lever is connected
to the brass, ~~[illegible]~~ which leaves
moving in the direction of
rotation of the dynamo.
bobbin cuts out resistance
the tendency of the field or
any part of it which is
moveable is to move in the
same direction as the rotating
armature and the tendency
increases with the load. Hence
this ring encircling the rotating
bobbin tends to rotate with
the bobbin in proportion to the
load hence it becomes a very
accurate device in connection

with resistance to regulate the lamp by the field magnet.

If plates of zinc with lead between which are placed insulating material such as porous plates, and several pairs of these placed in a cell half of the plates being connected to one pole & the other half to the other pole and the whole of the plates kept pressed together by a wedge spring, gravitation or otherwise

and a 20 percent solution of sulphuric acid be used and the liquid kept nearly to the boiling point & the battery while thus hot is connected to a powerful dynamo machine thick coats of peroxide of lead are formed rapidly all homogeneous & integral & in Electrical Contact with ~~the Electrode~~ this Coating when once formed remains integral the great object in perfect Storage Batteries always charging & discharging the Elements while they

are under pressure the
more porous [illegible] the pressure
is the better.

In forming Carbons for Electric
Light arcs I use non volatile
hydrocarbons such as the thickened
Rubber like substance obtained
from boiling the drying oil.
the Carbon finely powdered is
mixed with the viscous drying
oil either with or with asphaltum
and well ground it is then
dried and then put in a
powerful press & forced
out into sticks. they are
then baked & brought up to

a white heat then when cool are placed in tubes with a volatile hydrocarbon or bitumen coil, the tube is closed and the whole brought up to a white heat the gases formed enter into the pores of the carbon & deposit dense carbon therein due to the enormous high pressure in the tube due to the gases (chemically Chlorides of Carbon may be used) The tubes may be made so strong that a liquid hydrocarbons may be used and be brought to a white

heat, Extremely dense
Carbons are thus obtained
which do not oxidize just
above the arc like ordinary
Carbons hence will last
ten or 15 times longer than
ordinary Carbons besides
they are better Conductors of
Electricity.

When several filaments are placed
in series in one lamp sometimes
one of the filaments has a higher
resistance than the others in
this Case a side tube being placed
on the Exhausting tube &
containing chloride of Carbon
the particular filament is brought
up to incandescence for an instant
to reduce its resistance by a

300
3000
9000
3600
5) 3600
482

325
325
1625
650
975
1056 25 40
42250 00
42250
800) 464975
5800
185
3
525

15000
6
90000

1600
3
4800

260
3
780

800

deposit of Carbon in it, it is
then compared with the other
& when all give the same
light with the same volts
they are permanently connected
in series and the Lamp
sealed off at the pump -
another method is ~~to~~ shunt
the particular Lamp by a
very fibre filament exterior
to the Lamp but of any
higher resistance & through
which current passes it to
insufficient to bring it to
the oxidizing point this
resistance may be placed
in the base of the Lamp

12

1200
10

12000
3

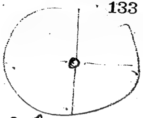
36.000 300

10800000
16

64800000
10800000

172800
86400

2000



8.000 000

10 000 000.
33

30000000
30000000

330,000,000

330000
2

$ 750,000

330.000 Ms.

86.400 Ms. 90.

60 - 16

1.12 - 10

85

16 10 — 12

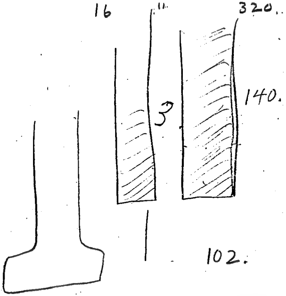
103 +40 — 320

10 103

60.

80.

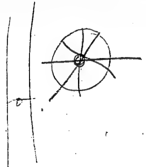
16, Candles. 140. ohms
90.000.
320. 40,000,



102. 1.20

16~

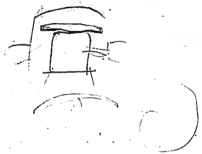
3

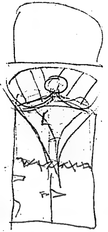


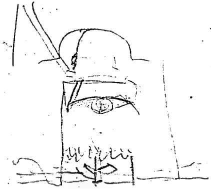
18

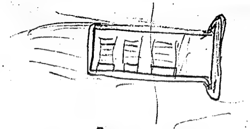
9

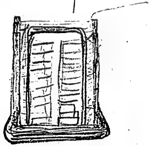
10, 320,

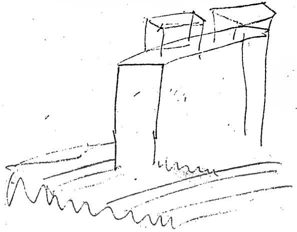


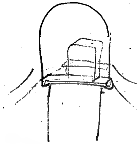


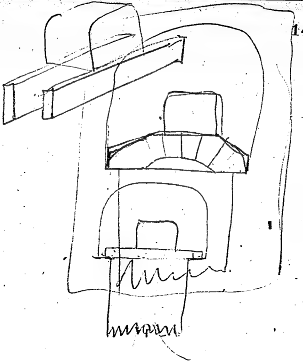


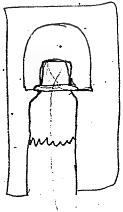


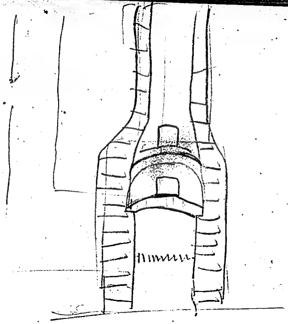


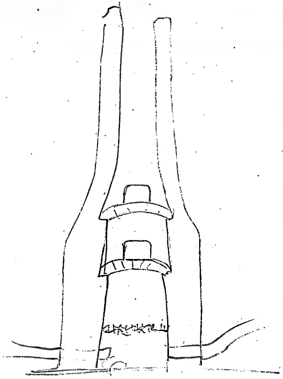


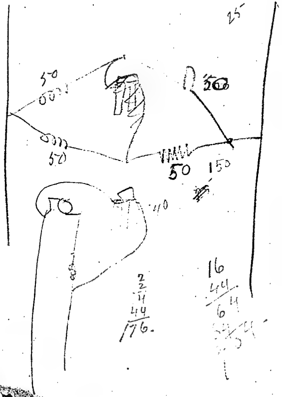








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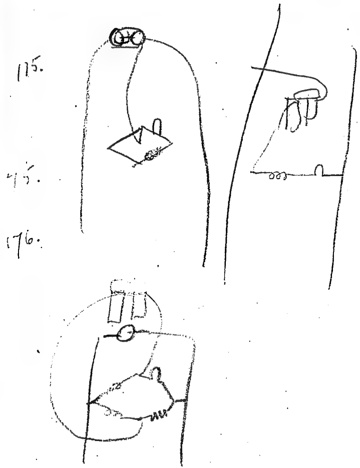
50
50
50
150
16
44
176.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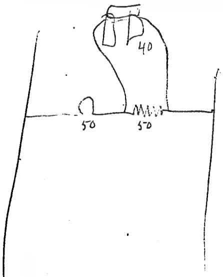

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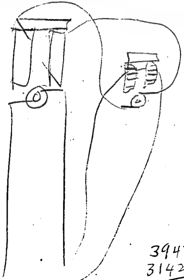


3942
3142
800

140) 440000 (3142

112
112
224

140) 551930 (3942

175) 3153 (18
175
1403
1400
178

35
18
280
35
630

175) 551930 (3153
525
269
175
943
875
680
525

140) 3153 (22
280
353
280

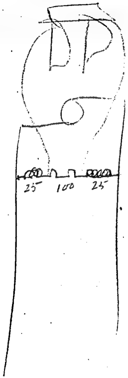
3
3150

22) 500 (35
66
140
110

35
22
70
70
770

22
35
110
66
770

175) 3942 (22
350
442
350
92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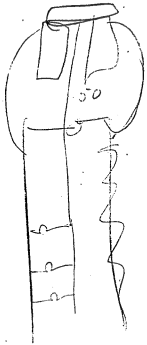
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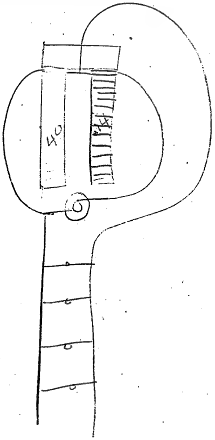
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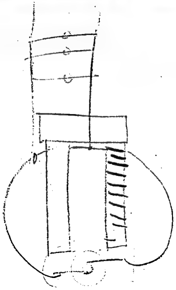
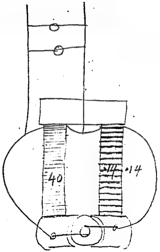


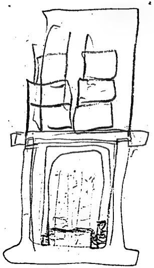


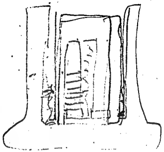
John Ott to try
and Roland to draw

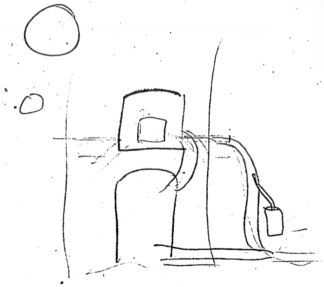
Aug 18 [illegible] 2

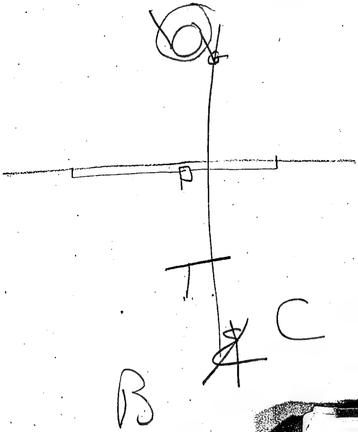
TAE

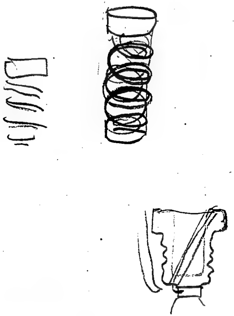
Deposit Carbon from pure CO or CO_2 ree of free O alters the Carbon Aug 15 1882

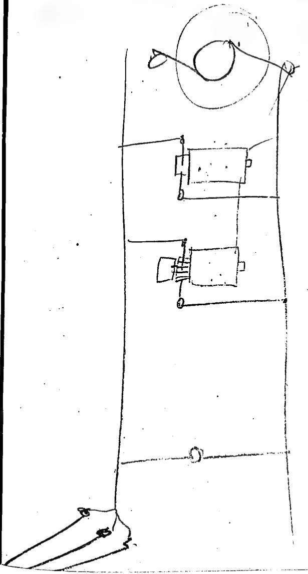


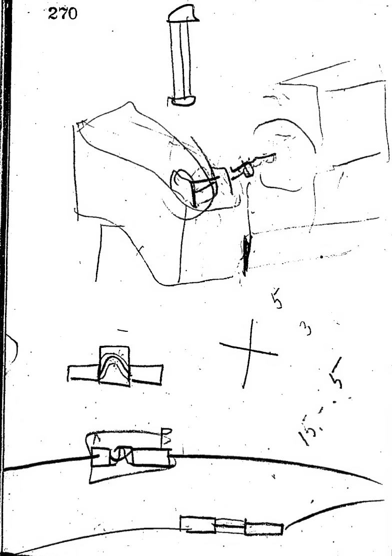


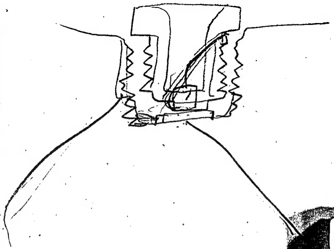


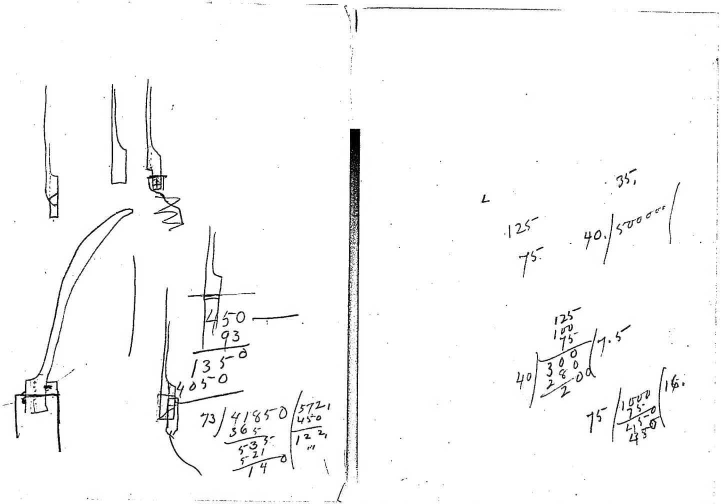

C
B









Mercury circle Motor.
Rubber expansion motor.
Photogh Scintillations with Cardr both
which Leyden + Big Coil + with Condenser
+ Battery or dynamo,

[ITEM FOUND IN BOOK]